

Highly Erodible Land and Swampbuster Provisions

Conservation Compliance and Wetlands Conservation Provisions of the Omnibus Farm Acts of 1985, 1990, and 1996

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Iowa landscape (Tim McCabe)

Abstract

USDA programs since 1985 have included conservation provisions that require an environmental standard to be achieved on certain categories of land in order to remain eligible for other USDA farm program benefits. The highly erodible lands and wetlands conservation provisions collectively work to reduce the rate of soil erosion from highly erodible croplands and to reduce the rate of conversion of other highly erodible lands and wetlands to crop production. These provisions generally do not create wildlife habitat directly but collectively support the conservation gains made by the Conservation Reserve and the Wetlands Reserve Programs. Some habitat enhancement may occur on highly erodible croplands if land users choose to implement conservation systems with holistic goals. While the greatest effect of these provisions is the reduction of soil erosion and the associated delivery of sediments and other pollutants to aquatic systems, there are substantial habitat gains made by other programs that would not occur without the interaction of these compliance provisions with the other USDA programs.

Introduction

For over 50 years, United States Department of Agriculture (USDA) conservation programs had primarily focused on reducing high levels of soil erosion and providing water of adequate quality and quantity to support agricultural production. Technical and financial assistance programs were offered to agricultural producers on a voluntary basis. USDA also offered commodity adjustment, disaster, and insurance programs to producers of agricultural commodities that were motivated exclusively by economic factors. The Food Security Act of 1985 brought significant change in the way the federal government addressed agricultural conservation issues. While participation in

USDA programs has always been voluntary, the changes brought about by the 1985 Food Security Act linked some conservation standards to all USDA farm program benefits. Since about 85% of agricultural producers participated in USDA farm programs, these changes were significant. This section briefly describes the legislative provisions that brought about those changes and what the impacts of those changes were to wildlife habitat. The report by Zinn (2000) provides an excellent description of this legislation for those desiring more information.

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Prior to 1985, the emphasis of USDA conservation programs had been on providing technical and financial assistance for the voluntary application of soil and water conservation practices. The Food Security Act of 1985 created three substantial new conservation provisions: Highly Erodible Land (HEL), Wetlands Conservation, and the Conservation Reserve Program (CRP). The HEL provisions included Conservation Compliance and Sodbuster. The Wetlands Conservation Provision was nicknamed “Swampbuster.” The HEL and Swampbuster provisions represented a new approach by halting access to federal farm program benefits to producers who did not meet conservation program requirements (Zinn 2000). The CRP took highly eroding cropland out of production in return for 10-year rental payments. All three provisions have been retained in amended form in subsequent farm bills passed in 1990 and 1996. These provisions collectively set an environmental standard for agricultural crop production.

Highly Erodible Land

Highly erodible land (HEL) is defined by USDA as land that has a soil erodibility index (EI) ≥ 8 . The EI is defined by factors from the Universal Soil Loss Equation (USLE, Wischmeier and Smith 1978) or Wind Erosion Equation (WEQ, USDA Soil Conservation Service 1978), whichever is applicable. The EI is computed using the soil, climate, and topographic variables from the USLE and WEQ in the numerator and the T-value (i.e., the tolerable limit required to maintain productivity) in the denominator. The EI calculated using this procedure does not include the effect of management practices such as contour farming or conservation tillage; therefore, it represents an index of potential erosion based upon natural conditions. Program rules generally define fields as HEL if more than a third of the area of the field consists of soil map unit components that are HEL.

Conservation Compliance applies to HEL that produced an agricultural commodity anytime during the period 1981-1985. Agricultural producers who cultivate HEL must have fully implemented an approved conservation plan by 1995. Producers who are out of compliance risk losing eligibility for most farm support programs on all the land they farm. The 1996 amendments (FAIR Act of 1996) expanded producer flexibility, allowed producers to self-certify compliance with their conservation plan when applying for benefits,

and removed crop insurance from the list of program benefits that can be denied. Of the 382 million acres of cropland in the United States in 1992, only about 28% of it qualifies as HEL (USDA-NRCS 1994), hence the Conservation Compliance Provision does not apply to over 70% of U.S. cropland.

Sodbuster applies to HEL that is newly converted to agricultural production from permanent cover such as pasture, rangeland, or forest. It requires producers who convert HEL to agricultural production to follow an approved conservation plan or they will lose eligibility for most farm support programs. Sodbuster discourages the conversion of HEL to cropland by requiring application of conservation practices, thus avoiding the undesirable effects of cropping HEL (increased erosion and sedimentation; reduced water quality; reduced wildlife diversity, abundance, and habitat). An additional benefit of sodbuster comes through supporting the conservation gains of CRP and Conservation Compliance by discouraging additional conversions of HEL. However, sodbuster provisions do not prevent conversion of permanent cover types to cropland. HEL can be converted to cropland when an approved conservation plan is applied, thus preserving the landowner's eligibility for farm program benefits. There are about 399 million acres of rangeland, 395 million acres of forestland, and 126 million acres of pastureland in the United States. Of those totals, about 41% of the rangeland, 32% of the forestland, and 46% of the pastureland occur on soils that meet the definition of HEL (USDA-NRCS 1994). The nonHEL portions of those landcover types are not subject to the sodbuster provisions, so conversion to cropland (and access to USDA farm program benefits) is not limited by HEL requirements.

Conservation plans approved by local Soil and Water Conservation Districts are required under the HEL provisions. Those plans, prepared with the assistance of the Natural Resources Conservation Service (NRCS), result from an evaluation of soil and site conditions, landowner objectives, and soil and water conservation treatment needs. The farm operator agrees to manage the HEL fields according to the plan. Conservation plans include management and practice specifications to reduce soil erosion. Examples of such practices include contour farming, terraces, conservation tillage (often including minimum amounts of crop residue left on the surface after planting), grassed waterways, cropping system specifications (i.e., crop rotation), and other practices. In some cases these practices also may benefit wildlife by providing food and/or cover suitable for some species, while in other cases there may be no benefits to wildlife. Converting a permanent cover type (i.e., pasture, rangeland, forest, etc.) to cropland would rarely result in an improvement in wildlife habitat. While the HEL provisions do not address wildlife habitat, there may be qualitative habitat improvements in agricultural ecosystems from the application of some conservation practices.

An additional benefit of sodbuster comes through supporting the conservation gains of CRP and Conservation Compliance by discouraging additional conversions of highly erodible land.

Because of political pressure in 1986 and 1987, the NRCS (formerly, Soil Conservation Service) allowed the use of Alternative Conservation Systems or scaled-down versions of conservation plans that would “substantially reduce” soil erosion rates without imposing an undue hardship on the producer. Concern was then expressed (Robinson 1988) that the teeth had been removed from the compliance mechanism.

Changes to the HEL Provisions Brought by the 1996 Farm Act

Conservation Compliance and Sodbuster have both been retained in subsequent Farm Acts since 1985. However, they have been amended in response to concerns of the agricultural community that the provisions had been enforced too vigorously and inconsistently from county to county (Zinn 2000). Consequently, the 1996 FAIR Act included the following modifications to the HEL provisions: (1) violators have up to a year to meet compliance requirements; (2) expedited variances have been developed for weather, pest, or disease problems; (3) approved third parties are allowed to measure crop residue (per conservation tillage requirements) and that those measurements include the top two inches of soil; (4) producers are allowed to modify conservation plans while maintaining the same level of treatment; and (5) local county committees may permit relief if a conservation system causes a producer undue economic hardship (Zinn 2000).



WRP restoration in Iowa (L. Betts)

Wetlands Conservation Provision

Swampbuster, or the Wetlands Conservation Provision, withdraws USDA farm program benefits from producers who convert wetlands after 1985 for the production of agricultural commodities. This incentive helped to protect wetlands from conversion. During the early settlement period of America, wetlands were perceived as an impediment to economic development, and up until the mid-1970s, wetland drainage and conversion was an accepted land-use policy (Mitsch and Gosselink 1986). Conversion of wetlands to cropland production accounted for 87% of the wetland losses during the period 1954-1974 (Frayer et al. 1983). From the mid-1970s to the mid-1980s, the role of agricultural development in wetland conversions had diminished to 54% (Dahl and Johnson 1991). By 1985, concern for wetland habitats had become so widespread that this provision was included in the omnibus Farm Act. More recent studies reveal that the annual rate of wetland loss has continued to decline and that agriculture's role in wetland loss during the 1982-1992 period had declined to about 20% (Flather et al. 1999). While Swampbuster's main impact has been to reduce agriculturally induced wetland conversions, it also has contributed to bids for the CRP and eventually for the Wetlands Reserve Program (WRP).

Swampbuster protects existing wetlands from conversion to crop production. It does not create or restore wetlands or require management on them. The

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following is an example of the positive effect that Swampbuster made: Many wetlands are characterized by great variability in the hydrologic cycle exhibiting years of very wet conditions, and others periods of very dry. Austin (1998) reported that widespread drought during 1988-1993 reduced wetland habitat available to waterfowl, causing a marked reduction in waterfowl production and noted that some species also declined due to the intensification of agricultural activities. The dramatic recovery of most duck species since 1994 resulted primarily from heavy precipitation beginning in 1993, which replenished many wetlands and flooded thousands of acres of land that had recently been used as cropland. During the dry phase of this cycle, it could have been easier to install drainage systems (i.e., ditches and tile lines) in these fields, but Swampbuster's effect was to inhibit drainage of these fields for fear of losing USDA farm program benefits. When the wetter phase of the cycle returned in 1993 and continued for at least seven years, the result was extensive areas of wetlands on land that had recently been in agricultural production. Swampbuster preserved this habitat that may have otherwise been lost.

Land-use Changes

Increased soil erosion and sediment deposition have been associated with the increases in cropland in the post-war era, but particularly since the rapid expansion of cropland that occurred during the 1970s. Concomitant to the implementation of the Conservation Provisions of the recent Farm Acts (1985, 1990, and 1996) have been shifts in the kind of land used for crop production. These changes are the net result of increased awareness on the part of agricultural producers, successful delivery of technical assistance, and the conservation provisions of the recent Farm Acts. Because of the confounding effect of these independent forces, it is not possible to single out specific cause and effect relationships, but it is evident that the "carrot and stick" approach to farm program benefits of the recent Farm Acts got the immediate attention of the agricultural community, particularly those producing commodity crops on HEL.

Evidence of the positive effect of linking land stewardship with farm program benefits can be observed from reviewing results from the National Resources Inventory (NRI) (USDA-NRCS 1994) and as reported by Flather et al. (1999). In 1982, 73% of the cultivated cropland was experiencing sheet and rill erosion rates lower than the T-value. By 1992, that level had increased to nearly 79% of the cultivated cropland (USDA-NRCS 1994). Likewise, wind erosion rates on cultivated cropland in the Plains states and other areas subject to wind erosion have declined. The proportion of cultivated cropland protected from wind erosion increased from 79 to 84% from 1982 to 1992 (USDA-NRCS 1997). These improvements stem from improved technology applied on the land and the conservation provisions of USDA Farm Acts since

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1985, including the removal of 34 million acres of eroding cropland that was enrolled in the CRP.

Other indicators of soil erosion that suggest better land stewardship are shown in Table 1. Sheet and rill erosion, as estimated from the USLE, declined nationally on both cultivated and noncultivated cropland from 1982 to 1992. In addition, wind erosion as estimated by the WEQ, declined in all regions except the Pacific Coast. Erosion rates declined between 1982 and 1992 primarily because much of the cropland area with elevated erosion rates was enrolled in the CRP, removing it from cultivation and protecting it with perennial vegetation for 10- to 15-year contracts, beginning in 1986. Another indication of better stewardship was the area of cropland with lower values of the erodibility index (EI) between 1982 and 1992. The number of acres in each of the EI categories for cropland have been reduced since 1982 (Table 1). Erodibility index values greater than or equal to 8 are considered to be highly erodible and those acres declined by 16%. Again, this is the result of land-use shifts where the most erodible cropland acreage has been shifted to other uses, indicating that USDA programs since 1985 targeted those lands with the greatest potential for environmental damage.

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National Resources Inventory data for 1982 and 1992 (USDA-NRCS 1994) indicate that sheet and rill erosion rates on cultivated cropland dropped from 4.5 to 3.5 tons/acres/year and wind erosion rates dropped from 3.7 to 2.9 tons/acres/year. Much of the erosion reduction came as a result of the CRP removing 34.4 million acres of eroding cropland from cultivation by 1992, but Conservation Compliance and Sodbuster were strong motivators to take action. Acres of cultivated cropland dropped from 366,199,800 acres to 325,462,100 acres.

Thompson et al. (1989) reported that even a relatively modest mandatory restriction on soil loss resulted in major reductions in erosion rates with modest increases in total production costs. While some doubts about the effectiveness of the HEL provisions had been expressed because Alternative Conservation Systems were permitted (Robinson 1988), it is clear from the preceding discussion that these provisions did make a difference. Research by the Economic Research Service also verifies this point; in the absence of compliance mechanisms, between 5.8 to 13.2 million acres (of HEL and wetlands) would be economically profitable to convert to crop production, depending on assumptions about future prices (Heimlich et al. 1998).

National Resources Inventory data also suggest that both the rate of wetland conversion to agriculture and the relative proportion of agriculture's contribution to wetland conversion declined from 1982 to 1992 (USDA-NRCS 1994, Brady and Flather 1994). Until this decade, wetland losses due to agricultural

activity had been the leading cause of wetland conversion, but these data reveal that the relative proportion of loss due to agriculture had declined to 20%. The average annual loss rate due to agriculture during this decade (31,000 acres/year) was about 20% of the average annual rate estimated by the Fish and Wildlife Service (Dahl and Johnson 1991) for the period 1974-1983. Wetlands in the Prairie Pothole Region are particularly vulnerable to agriculture drainage because most basins (80%) are less than one acre in size and greater than 75% are typically flooded only seasonally or temporarily during the growing season (Cowardin et al. 1995). While programs operated by the U.S. Fish and Wildlife Service to conserve wetlands and provide nesting habitat for waterfowl are very important, Reynolds and Loesch (in preparation) reported that without some form of wetland protection program, such as the Swampbuster provision, drainage of small, shallow wetlands would likely resume at previous high rates. They projected that without wetland protection the average breeding duck population in the Prairie Pothole Region eventually could decline by over 30% or 2.8 million breeding ducks/year.

The HEL and Swampbuster provisions were successful because they offered both the “carrot and stick”—penalties for noncompliance and rewards for compliance. Neither of these had the force of law, land users could still opt out if they were willing to forgo all USDA farm program benefits. Successes claimed by advocates of the CRP and WRP must acknowledge the role that the Highly Erodible Lands and Wetlands Conservation Provisions of the Food Security Act of 1985 played in motivating land users to apply for enrollment into the CRP and WRP. Land-use changes for the last few years have yet to be documented, but there is indication of increased conversion of marginal lands to cropland to compensate for a depressed agricultural economy, in part financed by USDA programs.

Wildlife Response

The HEL provisions did not directly create habitat for wildlife, but their impact was manifest indirectly (Robinson 1988, Brady 1988). They reduced soil erosion rates from highly erodible croplands or discouraged the conversion of HEL to crop production, thus protecting riparian, wetland, and aquatic habitats from excessive delivery of sediments and related pollutants. Additionally, these programs forced producers to evaluate how they wanted to use their agricultural lands. The alternative from the expense and inconvenience of complying with the Conservation Compliance provisions and risk of losing USDA benefits by violating those provisions was to bid their HEL land into the Conservation Reserve Program. Without this substantial incentive, the CRP would not have been nearly so successful.



Feeding northern pintail (W. Hohman)

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Robinson (1988) reported the main contribution of Conservation Compliance to wildlife improvement would probably come in the area of water quality, leading to better habitat for fish and other aquatic animals. Brady (1988) made a similar statement regarding Sodbuster. Robinson (1988) went on to state that it is likely that Compliance itself would have a relatively small impact on terrestrial wildlife species compared with CRP and Swampbuster, since much of the cropland subject to compliance would continue to be used for crop or hay production.

About 83% of compliance plans utilize crop residues or conservation tillage to help control erosion (Zinn 1998). Some have documented that benefits to wildlife increase as soil conservation practices are applied to croplands (e.g., Miranowski and Bender 1982). Others have suggested that this is not always the case, but that if wildlife habitat is jointly considered with other cropland management objectives, there can be benefits to wildlife habitat (Brady 1985, Brady and Hamilton 1988, Warner and Brady 1994). The net effect of conservation systems that include such practices as conservation tillage, contour strip-cropping, grassed backslope terraces, and field border strips may be beneficial to wildlife habitat if some (unspecified) level of biotic integrity is retained in the landscape mosaic (Warner et al. 1984, Warner and Brady 1994, Brady 1985). For example, the practice of leaving crop residues on the surface after planting (i.e., conservation tillage) has been shown to be beneficial for some species (Warburton and Klimstra 1984, Castrale 1985, Basore et al. 1986, Rodgers and Wooley 1983, Wooley et al. 1985, Best 1985, Duebbert and Kantrud 1987). There are only about 10 species of songbirds that regularly nest in cropfields and they generally have exhibited stable population trends (Best et al. 1997), although concern has been expressed that conservation tillage may act as an ecological trap for some (Best 1985). Warner and Havera (1989), and Warner et al. (1989) documented substantial use of waste grain by some wildlife during the dormant season.

The dramatic recovery of waterfowl populations in the Prairie Pothole Region since 1993 and population increases of Le Conte's sparrow have coincided with the amelioration of drought conditions in the Prairie Pothole Region (Austin 1998, Igl and Johnson 1999). To a great extent, this is the synergistic result of Swampbuster's effect of conserving wetlands, high CRP enrollments in the region, and favorable weather conditions.

Conclusion

The HEL and Swampbuster provisions of recent Farm Acts generally do not create additional wildlife habitat but help maintain or reduce the rate of loss of existing habitat . . .

The HEL and Swampbuster provisions of recent Farm Acts generally do not create additional wildlife habitat but help maintain or reduce the rate of loss of existing habitat, including much of that developed by the CRP and WRP. The HEL provisions reduce erosion from HEL croplands and reduce the rate of conversion of HEL lands to crop production, thus helping to reduce

delivery of sediments and related pollutants to receiving waters. This impact will benefit fish and other aquatic organisms directly, while terrestrial wildlife will be impacted indirectly. Better stewardship of HEL croplands may provide habitat benefits to wildlife if management decisions are broader than just erosion control. These provisions provide strong motivation for land users to enroll their HEL cropland into the CRP or wetlands into the WRP and discourage them from converting other HEL lands or wetlands to crop production; thus, they collectively support the conservation gains made by the other provisions. The net effect of the interaction of all these Farm Act provisions results in substantial wildlife habitat improvements under existing patterns of land use that otherwise would not be possible if the various provisions were implemented independently.

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Table 1. Comparison of cropland erosion indicators from 1982 to 1992 (USDA Natural Resources Conservation Service 1994).

Indicator	1982	1992	Units
Soil erosion ¹	4.0	3.1	Tons/acre/year
Soil erosion ²	3.4	2.4	Tons/acre/year
El ³ < 2	81,400	78,645	Acres × 1000
2 ≤ El < 5	134,023	125,738	Acres × 1000
5 ≤ El < 8	80,281	72,328	Acres × 1000
El ≥ 8 (HEL ⁴)	124,847	105,238	Acres × 1000

¹Soil erosion determined by the Universal Soil Loss Equation (Wischmeier and Smith 1978).

²Soil erosion determined by the Wind Erosion Equation (USDA SCS 1978).

³Erodibility Index (EI) is an index of erosion potential determined from the erosion equations.

⁴Highly Erodible Land (HEL) is defined as soil map unit components with an El ≥ 8.

